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Van Camp et al.

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(54) **METHOD AND APPARATUS FOR NEGATING EFFECTS OF CONTINUOUS INTRODUCTION OF RISK FACTORS IN DETERMINING THE HEALTH OF A PROCESS CONTROL SYSTEM**

6,801,920 B1 10/2004 Wischinski
6,813,532 B2 11/2004 Eryurek et al.
6,965,806 B2 11/2005 Eryurek et al.

(Continued)

FOREIGN PATENT DOCUMENTS

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EP 1 566 757 A1 8/2005
EP 3 156 871 A1 4/2017

(Continued)

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OTHER PUBLICATIONS

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Guardian Whitepaper, Steps to Improving Your System Health Score, Oct. 2014, © Emerson Process Management.

(Continued)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 412 days.

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CPC **G06Q 10/06** (2013.01); **G05B 23/0283** (2013.01); **G05B 2223/06** (2018.08)

(58) **Field of Classification Search**
None
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

6,571,285 B1 5/2003 Groath et al.
6,633,782 B1 10/2003 Schleiss et al.

(57) **ABSTRACT**

Negating effects of continuous introduction of risk in scoring the health of a process control system includes automatically and periodically assessing a risk for each of the process control systems, calibrating the center of a health score scale to the average risk assessments, and scoring the health of each process control system within the health score scale according to a nonlinear scale applied to the risk assessment. Introduction of a risk factor to a process control system increases the risk assessment, and elimination of a risk factor decreases the risk assessment. The same risk factor introduced to each of the of process control systems does not affect the health score of any process control system, and elimination of a risk factor has more of an effect on the health score towards the center of the health score scale than towards upper and lower limits of the health score scale.

24 Claims, 15 Drawing Sheets

